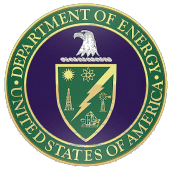
11th Generic EIC Detector R&D Meeting

Thomas Ullrich (BNL)

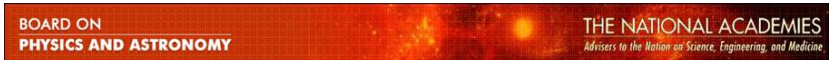
July 6/7, 2016



BROOKHAVEN NATIONAL LABORATORY

EIC - Status

- Nation Academy Review:
  - Charge is out
  - Committee still put together
  - 18 month review
  - Expect resolution Fall/Winter 2017
- EIC User Group
  - 633 members
  - 137 institutions
  - 27 countries
- DOE
  - $7M program for accelerator R&D split between labs
  - Dragging its feet on detector R&D



U.S.-Based Electron Ion Collider Science Assessment

Statement of Task:

The committee will assess the scientific justification for a U.S. domestic electron ion collider facility, taking into account current international plans and existing domestic facility infrastructure. In preparing its report, the committee will address the role that such a facility could play in the future of nuclear physics, considering the field broadly, but placing emphasis on its potential scientific impact on quantum chromodynamics.

In particular, the committee will address the following questions:

- What is the merit and significance of the science that could be addressed by an electron ion collider facility and what is its importance in the overall context of research in nuclear physics and the physical sciences in general?
- What are the capabilities of other facilities, existing and planned, domestic and abroad, to address the science opportunities afforded by an electron-ion collider? What unique scientific role could be played by a domestic electron ion collider facility that is complementary to existing and planned facilities at home and elsewhere?
- What are the benefits to U.S. leadership in nuclear physics if a domestic electron ion collider were constructed?
- What are the benefits to other fields of science and to society of establishing such a facility in the United States?

Detector R&D and DOE

- Strong support for R&D from Gulshan Rai (Medium Energy Physics) and Manouchehr Farhondeh (Advanced Technology R&D) but nothing concrete
- Tim Hallman: for now detector R&D has to be “hidden” in operation budget otherwise risk to lose what we have
- BNL ALD (B. Mueller): Push and lobbying has to come from EIC UG
- FY2017 is settled (and small), push for larger FY2018 budget
- Start planning to visit DOE (first discussions in next days)
- Observations
  - US Elections - DOE hesitant until new admin in place
  - Cherry Murray: push for internationalization of EIC
- FY2017
  - R&D funds come out of RHIC operation
  - Flat- Flat: $1M+ε this year

FY2017 Proposals - the Good and the Bad

- **Record participation**
  - 8 new proposals
  - eRD12 concluded
- **New strong international groups**
  - Birmingham - Central vertex tracker (brings in state-of-the art Si lab and DIS experience of PIs)
  - Trieste - RICH detectors (brings in lots of experience from COMPASS upgrades)
- **Total funds requested: $2.45M**
- **Worst ratio** of available/requested funds ever ~ 0.41

However

- **Not every proposal is strong**
  - Many are off target (not EIC directed or relevant in light of what is needed)
    - Radiation hardness?
    - TPC ion back-flow studies?
  - For established groups (especially consortia) the line between R&D and PED gets more and more blurred
    - TPC field cage prototype?
    - Development of HV and gas systems?
- Even if we had $2.45M it would be irresponsible to award all of it since a large fraction is off target and not defendable
- On long term: do we need a pre-selection process?

EIC Requirements (I)

- To help committee two talks were added by Alexander Kiselev and Rik Yoshida
- Charge:

The main purpose of the talk is to educate the committee and help them make the best decisions. Especially now that we have so many requests and a small budget, we need to focus on what is really needed. Input of this kind was not only requested by the committee but also by several participants.

The talks should not focus on any existing detector concept that is currently studies at either BNL or JLab. It should rather summarize the requirements, the possible technologies on the market with which these requirements could be met, and point out areas where R&D is needed, either to reduce cost, increase performance or make things possible in the first place.

Each talk should also emphasize the site-specific requirements, mostly stemming from the IR design and specific machine parameters. Still I think that a large fraction of requirements and solutions will be rather similar. I would like to ask you to coordinate coordinate your talks to avoid repetitions.

As you might have seen, not all proposals are really EIC targeted and some will need to be weeded out. That's the job of the committee but they will need some guidance. Please do not address or directly criticize any specific R&D proposals that are out there. If you think that a given technology is well developed and perfectly matches the needs feel free to say so.

EIC Requirements (II)

- Work on a requirements and R&D needs document (EIC R&D White Paper) meant for committee and future proponents is in the works but did not get ready for this meeting.

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Miscellaneous Notes (I)

- The number of groups involved in GEM prototyping and testing is increasing (e.g. WIS request). Do we need yet another GEM project?
- Commercialization of GEM seems to have found an end with possible consequences for various projects
- sPHENIX is a proposed as last-days RHIC detector that is sold as possible low-entry EIC detector (ePHENIX) that sneaks in various places. While some items might be relevant for an EIC many are not (IBF studies, prototypes, PED, etc)
- eRD1: some discrepancy in W-powder EMC test beam results (factor 2 in resolution!)
- Two strong Si groups (LBL, UB), one central one forward tracker, one with world-class composite material lab and electronic expertise, the other with a state of the art Si detector lab: room for collaboration?!

Miscellaneous Notes (II)

- eRD14: current contact person (Pawel) will leave JLAB. Leadership crisis of eRD14 remains!?
- Trieste proposing RICH R&D does so via eRD6 not eRD14. Possibly symptomatic for state eRD14 is in.
- eRD3, eRD6 and “slash” document eRD3/eRD6 are rather confusing (see clarification sent via email last week).

Agenda - Wednesday, July 6

Wednesday, July 6, 2016			
08:00	Registration		
08:00	Committee Executive Session - Building 203, R-150		
	Title	Speaker	Slides
08:30	Welcome and Overview	Thomas Ullrich (10'+5')	
08:45	JLEIC - Detector Requirements and R&D Needs	Rik Yoshida (25'+5')	
09:15	eRHIC - Detector Requirements and R&D Needs	Alexander Kiselev (25'+5')	
09:45	eRD1 - EIC Calorimeter Development	Oleg Tsai/Tanja Horn (30'+5')	
10:20	Coffee Break		
10:40	eRD2 - A Compact Magnetic Field Cloaking Device	Nils Feege (20'+5')	
11:05	eRD3 - Lightweight barrel and forward tracking prototype systems for an EIC	Bernd Surrow (20'+5')	
11:30	eRD6 - Tracking/PID Consortium	Tom Hemmick (35'+5')	
12:10	Lunch Break and Committee Executive Session - Building 203, R-150		
13:15	eRD12 - Polarimeter, Luminosity Monitor and Low Q2-Tagger for Electron Beam	Richard Petti (20'+5')	
13:40	eRD14 - PID Consortium	Pawel Nadel-Turonski (35'+5')	
14:20	eRD15 - Compton Electron Detector R&D	Alexandre Camsonne (20'+5')	
14:45	Coffee Break		
15:05	eRD16 - Forward/Backward Tracking at EIC using MAPS Detectors	Ernst Sichterman (20'+5')	
15:30	eRD17 - DPMJetHybrid 2.0: A Tool to Refine Detector Requirements for eA Collisions in the Nuclear Shadowing / Saturation Regime	Mark Baker (Video) (20'+5')	
15:55	Committee Executive Session - Building 203, R-150		

Agenda - Thursday, July 7

08:00	**Committee Executive Session - Building 203, R-150**		
	Title	**Speaker**	**Slides**
8:30	**Proposal to Develop Imaging Hadron Calorimetry**	**José Repond (20'+5')**	
8:55	**Performance characteristics of the SiD detector for deep inelastic events at the electron-ion collider**	**Jose Repond (20'+5')**	
9:20	**Proposal to Realize Radiation Tolerant Magnetic Immune Radiation Detector Readout Using Optical Phase-modulation-based Electro-optical Coupling**	**Wenze Xi (20'+5')**	
9:45	**Precision Central Silicon Tracking & Vertexing for the EIC**	**Laura Gonella, Peter Jones (20'+5')**	
10:10	**Coffee Break**		
10:30	**Precision Timing at the Electron Ion Collider**	**TBD (20'+5')**	
10:55	**4D Tracking Detectors: Monolithic Fast Timing Silicon Detectors**	**TBD (20'+5')**	
11:20	**R&D Proposal for Detailed Simulations of Machine Background Sources and the Impact to Detector Operations**	**Elke Aschenauer (20'+5')**	
11:45	**Developing Analysis Tools and Techniques for the EIC**	**Markus Diefenthaler (20'+5')**	
12:10	**Lunch Break & Committee Executive Session - Building 203, R-150**		
13:00	**Close-Out - First Impressions**		
13:30	**Adjourn and Start of EIC User Group Meeting**		